

A FIELD TRIP TO NEW CALEDONIA

by Peter Jones and Mark Wilson

In August 1984, Mark Wilson and myself visited New Caledonia and collected several species of carnivorous plants. It was a trip that we had been discussing for about a year, but we had never quite managed to find time to go. However with the news in May 1984 that the Kanak population had given the French until 1985 to declare the island an independent nation "Or Else," we decided that we had better get over there soon, before any trouble started. It would have been a great pity to miss the opportunity to go there, as it is only 2.5 hours by air from Sydney, and has some unique carnivorous flora. The two months before our departure were spent researching the plants' habitats and locations, planning the logistics, and making contact with the relevant government authorities to arrange collection permits. I cannot overstress the importance of this point, as it is definitely not legal to remove plants from their habitat without written approval.

We arrived at La Tautouta airport on the evening of the seventeenth of August, after a leisurely flight aboard an Air France DC 10, where we spent the time chatting and drinking French wine. Upon arrival we were driven to the Isle de France hotel for a good night's rest.

We awoke to a beautiful Saturday morning, the view from the hotel which overlooked the Anse Varta beach was magnificent. After a quick shower and breakfast, we decided to pick up our rental car so that we could look for plants as soon as possible. Our cab driver deposited us in front of the Hertz office, and their efficient staff soon had us equipped with a Fiat hatchback. With maps in hand we drove off to look at the nearest *N. viellardii* site. We arrived, only to find that suburban Noumea had grown quite a bit since the plant was recorded here in 1906. Although the mountains were still here, houses surrounded their bases and we could find no access to climb. Driving down the Noumea to Yate Road at Magenta we stopped at the base of a hill, and decided that it looked like *Nepenthes* should grow there, however we found nothing of any real interest amongst the dry forest which covered its steeply sloping rocky southern side. After an hour of fruitless searching, we reached the top and were rewarded by a wonderful view of the sea. Mark took the opportunity to collect some *Mimosa pudica* seed while I examined one of the many large land snail shells which were found in this area. We were disappointed by our lack of success, and after descending we decided to drive to Mt. Koghi which was a well-known site and had a sealed road to the summit.

After a thirty minute drive North West we reached the base of the mountain and as we drove up its southern slope, both of us noticed that the forest was far more lush here, it obviously received more rainfall than the previous site. We drove slowly up the narrow winding road with our eyes glued to the road verges, several times we stopped to look at plants whose leaves looked like those of *Nepenthes*, however each time was a false alarm. Finally we drove up a tight right hand turn and emerged from the forest zone, into an area of low shrub which was bathed in bright sunshine. We pulled off the road onto a dirt area which was obviously meant for parking. Mark and I got out of the car, and started for *N. viellardii* on the roadside verges, after a few minutes of unsuccessful searching, Mark shouted "I've found one," I rushed over and he pointed to a small rosette, which was almost completely hidden under some ferns.

It had only a couple of pitchers and they had seen better days, but we had found the plant that we had come so far to see. It was marvellous to look at this hardy little plant in its natural environment for the first time.

Climbing the embankment we found another, and then several close together amongst the shrubs and grasses. The more we looked the more we found, there were dozens. Most of them were fairly small, being rosettes between 100mm and 300mm in diameter, with thick succulent leaves. All of the plants here obviously grew in hard conditions, few exhibited the straggling green vines with long spaces between the leaves which are so typical of most

Nepenthes. Where the plants did produce stems most were devoid of leaves except at the growth tip, where they formed a rosette of closely spaced leaves, much in the manner of juvenile *N. albomarginata*. Here and there a plant had gone into vine, and climbed through a tree, when this occurred we found it easiest to spot, by looking for a mass of black vines, winding through the canopy of the tree, rather than by looking for pitchers. The tendency of the plants to have such a short growth tips, made taking cuttings very difficult indeed. Some *N. viellardii* at this site strongly resembled the plants that Dubard described as var. *Deplanchii*. Although most of the plants here had all green pitchers, some did produce beautiful scarlet lower pitchers. We were fortunate to find a few old seed pods from the previous November or December that had retained their seeds. Surprisingly these and all other *Nepenthes* seeds collected on the trip germinated rapidly. One thing that puzzled us was that although the plants here obviously produced millions of seeds each season, we were only able to find half a dozen seedlings in this whole area. Already one plant was beginning to flower for the coming season, it was a lone stem 300mm long that grew in a dry arid spot on its own, surrounded by the long dead stems of previous years.

After taking all the photos that we needed, Mark and I continued on up the road, which is lined with *Nepenthes* from 500m to 1070m. On the summit of Mt. Koghi stand a number of wooden tourist chalets, if you wish to stay the night. The temperature was about 25°C and humidity about 60% - 70% that day. The plants obviously preferred open scrubby areas to the shade of the forest, we saw only two plants in the forest and hundreds in the open. The delineation between these two vegetation types is easily visible from a distance. The soil is a red ultrabasic loam, which has a high mineral content, little organic matter, and an acid pH. Mt. Koghi receives more rainfall than most of the other mountains further south because it lies across a valley from the Humbolt ranges, which are the highest on the Island (1350m here and 1619m further north). They form a rain shadow, and Mt. Koghi receives the rain that is trapped by them. During our last three days in Noumea the Humbolts were covered by heavy cloud which never moved any further south.

NOUMEA 22 16'S.			166 27'E 30ft.		NEW CALEDONIA		
Period 1860-1914 Bibliography 24, 27	Average daily °C Max. Min/.		Temp. absolute °C Max. Min.		Relative humidity Average of observations at 0900 1500		Precipitation Average monthly fall mm
January	30	22	36	18	72	70	92.5
February	29.5	23	37	18	75	72	127.5
March	29.5	22	35	17	76	73	142.5
April	28.5	21	35.5	16	77	74	130
May	26	19	33	14.5	75	71	110
June	25	18	31	13	76	70	92.5
July	24.5	16.5	30	11	76	69	90
August	24.5	16	29	12	72	68	65
September	25.5	17	32	13	70	67	62.5
October	26.5	18.5	34.5	15.5	68	66	50
November	28.5	20	34.5	15.5	69	67	60
December	30	21	36.5	17	70	68	65



Habitat of *N. viellardii* on Mt. Koghi at 600 m. altitude, south west face. All photos by Peter Jones & Mark Wilson.



N. viellardii from Mount Koghi. Upper pitcher at 600 m. altitude, south west face.



N. viellardii from Mount Dore. Upper pitcher at 405 m. altitude, north face.



Habitat of *N. viellardii* on Mt. Dore at 400 m. altitude, north face.



***N. viellardii* from Mount Dore. Lower pitcher at 420 m. altitude, north face.**

Sunday morning was warm and balmy, we decided to drive across the island to Yate which is on the east coast. About 20 km from Noumea we first saw Mt. Dore, it is an impressive mountain, even though it is only 772m high. As we drove past its northern slope we decided to stop and have a look. This mountain was much drier than Mt. Koghi, its lower slopes were covered with small trees and dense scrub. A small stream ran down the slope, so we followed it until at 300m alt. it disappeared underground. The soil was dry, red ultrabasic loam. It became a standing joke with us that the travel brochures spoke of a tropic isle, and we were climbing a mountain that compared favorably with some of the more arid parts of Australia. The plant species here were quite clearly related to our own flora, which gave the place a look of familiarity. At 300m alt. the trees gave way to the low shrubs and bushes, at this point the ground sloped steeply upward and our progress was hampered somewhat by loose soil. The slope became more easily traversable, once we reached the 400m level and climbed onto an old unusable dirt road.

We began to follow the old road in a westerly direction, then Mark said "Is that one up there" and pointed to a small sloping gully in the red soil. Scrambling up to the plants we saw that the upper pitchers were green with black peristomes and the lowers were all scarlet or purple. There was not much fluid in the pitchers and it was extremely viscous, very little prey was found inside. Moving on in the same direction, we found many small gullies, most contained *N. viellardii*. All had superb dark purple lower pitchers, but the upper pitchers were plain green. With no surrounding vegetation to support them, they ran downhill on the bottom of the gullies, often for some distance. Some of the old black woody stems were in excess of 40mm thick. As on Mt. Koghi the amount of seed released in this area each year, must have been enormous but we were unable to find even one rosette, let alone a seedling. It was now obvious to both of us, that the plants grew only in gullies on this mountain and that is where we concentrated our search. While continuing to climb in a westerly direction we found the gullies becoming larger and the *Nepenthes* fewer, the soil had changed too. As we gained altitude it now had a blackish red concrete hard crust over the softer soil. Some of the steep slopes were covered with a layer of dark red rounded nodules, negotiating these was like walking on ball bearings.

We were now on the western ridge of the mountain's north face at about 550m alt. It had been some time since our last *Nepenthes* sighting, so we travelled back toward the east ridge and finally crossed over it into a large re-entrant which faced north east. Immediately we did so spikey greyish grasses became abundant, moving down the slope, we saw our path was intersected by a gully about 2m deep. As Mark was climbing down the gully he spotted *Drosera neo-caledonica* growing amongst the grass clumps. Dozens of them were everywhere nestling at the base of the clumps, their stems were up to 75mm long and clothed with the dead leaves of the previous seasons. The colour of the dry stems matched the colour of the grass, no wonder we had walked by without seeing them. In appearance the plants resembled one of the larger pygmy sundews from Western Australia rather than *D. petiolaris* which is its closest relative. The soil here had a distinct feel of dampness about it. Across the other side the gully joined another which was much broader. Following this uphill for a short distance we spotted a small shrub in the middle of the gully covered with *N. viellardii*, whose pitchers had large holes eaten in them. Upon examination we found that many were inhabited by mosquito larvae. We were lucky enough to be able to collect seed from some of the many old pods left from the previous summer. *D. neo-caledonia* was also quite common here, some of which were just beginning to put up flowering scapes. As it was getting late in the afternoon, we reversed our course, headed downhill and crossed to the far side of an enormous gully, which ran down towards the base of the east ridge. It was some time before we could find a place to scramble down into it, here we found the only small rosettes that we were to see on Mt. Dore, they were growing about 2m up on the vertical gully wall. Two hundred meters further down Mark discovered the most impressive *N. viellardii* we had seen to date, it was growing in a rocky section of the gully which narrowed to about 1m, the plant was a 200mm wide rosette with a long green vine, the pitcher resembled a *N. khasiana* upper

but it was scarlet. Mark and I climbed out of this large creekbed, and then ascended the near vertical slope of the east ridge. We moved onto the north face at about 400m alt. and then descended diagonally across the face. We intercepted the western ridge at about 100m alt. where we found a small waterfall, the trees and shrubs grew thickly here, and in a tree at the base of the falls grew the last *Nepenthes* that we saw on Mt. Dore. The plant had all green lowers, and green uppers with black peristomes. The root system of the *N. viellardii* that we collected was unlike that of any *Nepenthes* we had seen before. The plants were equipped with a thick single taproot, which ended in a short tassle of black fibrous rootlets. The rosettes we found were only 150mm across, but they had taproots 320mm long. This made careful excavation essential when removing plants from the soil.

On Monday we spent half the day visiting the herbarium at O.R.S.T.M., the director Monsieur Moreau was extremely helpful and suggested locations for us to try, he also finalized our paperwork. The rest of the day was spent sightseeing. We spotted an aircraft wreck on the right-hand side of the Noumea to Yate Road the previous day, and had decided to have a closer look. It turned out to be a Hawker Heron and was not in too bad a condition, the engines and anything else of value had been removed though.

On Tuesday we resolved that we would drive to Yate, we had meant to go there on Sunday, but had climbed Mt. Dore instead. We stopped a few times to collect *N. viellardii*, in the hills between Mt. Dore and Mt. Col. de Mourange, however east of this point no more *Nepenthes* were found. Past Mt. Dore we drove through mountains which were covered with dry scrub and low trees, the only forest to be seen was always located on the southern slopes of these mountains, and even then, only in large shaded re-entrants. About 9km from Mt. Col. de Mourange the car passed a steep hill with an enormous gully eroded through its higher slopes. The soil was dry ultrabasic. It looked like a likely spot, so we stopped the car and followed a trail up its northern slope. About 300m from the road we found *D. neo-caledonica* growing, near a large electricity pylon, among grass clumps. One was in flower, it was the first we saw on the trip. Retracing our steps we continued on our way. As we drove past the shores of the lake at Marai Kiki Mark spotted some black vines covering a small roadside shrub, so we stopped to look around. There were *Nepenthes* everywhere, scrambling through the bushes about 100m from the edge of the lake. These plants had vastly different pitchers from the others we had seen, they were squat and barrel shaped. In fact they were very similar to plants illustrated in Dansers monograph¹. Our site at the lake was about 100m alt. Most of the pitchers were all green but some did have coral pink or black peristomes. Once again we found evidence of massive seed production but no seedlings could be seen. Closer to the lake the red soil was covered with blackish stones and gravel, amongst this, in full sun grew clumps of *D. neo-caledonica* the gravel surrounding these plants was hot enough to be uncomfortable as we took our photographs. The *Droseras* were about 50mm across and grew on long stems covered with dead leaves. None were flowering but many had started to put up scapes. A search of this side of the road revealed nothing new, so we drove off towards Yate. A few kilometers from the lake, the road climbed into the mountains once more. About 14km from the lake the road entered a plateau, where we found a pond. This had *D. neo-caledonica* growing around its edge, in the wettest conditions imaginable, some were completely submerged, many were flowering, these were the biggest *Droseras* we found. They measured up to 80mm across with flowering scapes as high as 250mm. The flowers were white and up to 25mm across. Soil was ultrabasic mud with decayed clumps of reeds forming hummocks of peat. Under the water at the edge of the pond grew *U. uliginosa*, some of the leaves were 40mm long few flowers were present, but as the leaves formed an extensive mat above the mud, the plants were easily seen. We continued on to Yate but from this point no more carnivorous plants were seen.

We decided to spend Wednesday exploring the hills around the man made lake at Marai Kiki *Nepenthes* scrambled through the roadside shrubs, but as we walked toward the hills the soil developed a very hard crust. Here and there rivulets had carved small crevices into the soil during the wetter seasons. In these crevices the *Nepenthes* grew in profusion, anchoring



Habitat of *U. uliginosa* ? & *D. neocaledonica* at 300 m. altitude, 14 km from Maral Kiki on the Noumea to Yate Road.



D. neocaledonica from Maral Kiki at 100 m. altitude.

themselves in the dry red soil on the bottom or driving their taproots into the vertical walls in soil so hard that it was difficult to remove plants with an entrenching tool. *Nepenthes* grew everywhere both small and large. Their seeds had obviously found here what was lacking in all the other sites we had visited. Curiously enough the plants on this side of the road were generally like the ones we saw on Mt. Dore. They seemed to grow most profusely, in a band on the exposed northerly faces of the large eroded gullies, around the base of the hills. Some pitchers were heavily splashed with red most however were all green, the lower pitchers varied from near white to purple. At the western end of the search area a small stream tumbled down a steep rocky hillside it was a cool and refreshing diversion. Mark followed the stream across the road, it turned into a large and very wet gully near the lake. The plants here had pitchers of the squat type but their colour was a spectacular scarlet. Curiously these plants had no taproot instead they had an extensive system of black fibrous roots. Some seeds were collected and more photos taken. As the sun sank low on the horizon we drove back to the hotel.

Thursday was spent cleaning, sorting and packing the plants. That afternoon we drove into town and arranged for their shipment as air cargo the next day. We returned our hire car and walked back to the hotel. Friday morning we were taken to the airport by bus, and after an hour's delay, we flew out of La Tontouta on an Air France 747 bound for Sydney. The only species of carnivorous plant recorded from New Caledonia that we did not see, was *U. canacorum*, we knew where to find it but simply did not have the time this trip. When the country is stable again we would like to return for a longer visit.



D. neocaledonica flower at 350 m. altitude, 9 km east of Mount Col de Mourange on the Noumea to Yate Road.



***U. uliginosa* ?** from roadside pond at 300 m. altitude, 14 km from Marai Kiki on the Noumea to Yate Road.

If you are thinking of going there in future, our advice would be to do so in seed season. As the plants flower from September until November we feel that December or January would give the best results. Neither the *Nepenthes* nor *Droseras* like root disturbance but, field collected *D. Neo Caledonicas* have an extremely high mortality rate, so we would recommend that only seed of this species be collected.

Both myself and Mark would like to thank Dr. Ben Wallace and John Forlonge of the Royal Botanic Gardens Sydney and Dr. Moreau, Le Directeur, De Herbarium O.R.S.T.M., for all their kind advice and assistance, without them our trip would not have been possible.

FOOTNOTE

¹In the *Nepenthaceae* of the Netherlands Indies by B H Danser the author referred to plants collected on the Doormantop in West Irian at 3250m alt. and 3520m alt. by H J Lam.

On page 396 he states " The plants of the Doormantop (Lam 1637 & 1654) have strongly abbreviate stems and are obviously an alpine form only; they have nearly round lids like the plants of New Caledonia."

The characteristics that Danser felt constituted an alpine form of this species are common amongst *Nepenthes viellardii* growing in arid conditions from 100m alt. to 800m alt. in New Caledonia. Although the plants that H J Lam collected have their growth stunted a little more than many of the plants of this species on New Caledonia it is only a matter of degree. The *N. Viellardii* which grow in arid conditions on that island use the same growth habit to cope with low humidity and lack of water as do the plants from the Doormantop which grow in freezing temperatures at high elevation Pitcher shape is not related to growth habit it represents genetic variation within this species, Eg; pitchers similar to Lam 1637 & 1654 were observed on plants growing in both dry and arid and wet and humid conditions at a site near the lake at Marai Kiki 100m alt.

All plant collection on this trip, was made in accordance with Permit No. 3330-844.

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